RailBox/DVA0_V2

5G vehicle communication gateway for road and railway applications, ITxPT compliant

APPLICATIONS
Public transportation : trains, metros, tramways and buses

- 5G router + GNSS + WiFi 6 (fast roaming)
- 2 Ethernet ports 2.5 Gbps
- Multi-functions router, AP, client
- Smart Traffic routing (WiFi / 5G)
- Built-in Cybersecurity (EN 18031) with File system integrity monitor, secured access, VPN, firewall...
- Remote administration and monitoring with WaveManager
- EN50155, EN45545, ITxPT and ECE R10 certified router
- Ultra-wide 24 to 110 VDC with dual insulated redundant power supply input
- Extended operating temperature range from -40°C to +70°C
- Shock and vibration proof, IP66

Introduction

RailBox/DVA0 V2 is a rugged device designed for road and railway applications. It can be mounted on trains, subways, trams, buses or in any vehicle that requires robustness and high bandwidth for innovative services on the move (such as buses):
- Uninterrupted train-to-trackside communications (CCTV, VoIP, preventive maintenance, PIS...)
- High Speed data offload at the station or depot
- Passenger services like onboard WiFi, videostreaming, entertainment, infotainment...

RailBox/DVA0_V2 is equipped with high-speed wireless technologies for transmitting data to and from vehicles. For public transport applications (trains, metros, trams and buses), RailBox/DVA0_V2 makes it possible to pool all data streams (SAE, ticketing, PIS, CCTV...) on a single router. Its WiFi fast roaming capabilities ensure continuous data transmission when vehicles arrive at the depot/ station. Its automatic switching capabilities between WiFi and 5G ensure service continuity when they go into operation.
Smart policy routing (5G / WiFi), along with segmentation and prioritization capabilities, allow seamless transmission of onboard applications (ticketing, AVLM/ACS...) including high-demanding real time applications such as CCTV and VoIP with no failure.

The onboard network being an extension of the operator IT network, it is now mandatory to secure the vehicle network according to NIS 2 regulations. ACKSYS RailBox/DVA0_V2 integrates the latest cyber-security standard EN18031, including firmware control, robust encryption and authentication, along with network isolation, priorization and firewall to secure network integrity.

Remote administration and monitoring of the routers' fleet is performed with cloud or 'on-premise' ACKSYS WaveManager. The MQTT broker and bridge facilitate data transmission, system maintenance and monitoring of all onboard equipment.

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Technical Characteristics overview

Ethernet interfaces	2-port Gigabit Ethernet 100/1000/2500 auto-sensing, up to 5 Gbps link aggregation, water and vibration proof, rapid connect 8-point M12 X-coded connectors (CAT-6A), plug & play mode & auto MDI/MDIX cross-over
Radio interfaces	**High-Speed WiFi** • Standards: WiFi 6 (802.11ax) with Adaptive Noise Immunity (ANI), DFS (Dynamic Frequency Selection), and TPC (Transmit Power Control) • Bands: dual band 2.4 & 5GHz (support for HT20, HT40, HT80, HT160 channel widths) • Radio data rate: up to 3.6 Gbps • Max output power: up to 24 dBm (aggregate EIRP, per regional regulations) • Antenna: 3x3 MIMO (3x QMA female connectors) **5G/ LTE Connectivity** • 5G: SA/NSA modes, Sub-6 Ghz, DL up to 2.5 Gbps / UL up to 650 Mbps • 4G: DL Cat 16 (up to 1 Gbps) / UL Cat 18 (up to 200 Mbps), with 5CC carrier aggregation (DL) and 4x4 MIMO • 3G: backward compatibility with WCDMA/HSPA+ • Region: global (except for China), • Private 5G/4G: supports n38 (3.5 GHz), n77 (3.7–4.2 GHz), and n78 (3.3–3.8 GHz) for private networks • Antenna: 4x4 MIMO (4x QMA female connectors) **Positioning/ GNSS** • Multi-constellation support: GPS, Galileo, GLONASS, Beidou, QZSS • Accuracy (open sky): ≤ 1.9 m (CEP 50%) • Antenna : active GNSS (1 x QMA female connector)
SIM	2x micro SIM (dual SIM redundancy for high availability)
Cellular services	Dynamic DNS, Auto APN, Switch SIM, Multi APN
WiFi Modes	Client or router with fast roaming capabilities (less than 30 ms), Access point, Rogue AP detector
WiFi Services	Hot Spot 2.0 with Wireless Load Balancing (load balancing, band steering, client roaming control, association control per SSID)
Security	EN18031 certified with firmware integrity check, firewall, DoS, https, MAC filtering, WPA2/WPA3-Personal & Enterprise (IEEE 802.1X/RADIUS), tunnels L2 (GRE), VPN (OpenVPN, IPsec), SNMP V3, Rogue AP detector, file system integrity monitor, strong password policy, ports and services management
Ethernet networking	IPv4/IPv6 compliance, frames filtering, bridging, repeater, STP/RSTP, VLAN and QoS, DHCP (server & client), DNS relay, LLDP, MQTT (bridge & broker)
Ethernet routing	Multicast (PIM), IP redundancy (VRRP), static routes, NAT 1:1, NAT router, router
ITxPT	Services: Inventory, Time, GNSS location, MQTT (bridge & broker)
Administration & easy maintenance	https, MQTT, SNMP agent (V1, V2C, V3), CLI WaveManager administration software (cloud and on-premise versions) Save / restore configuration key (C-Key) - MTTR < 2 minutes Fanless, no battery
LEDs signaling	Radio: quality, activity and status | Ethernet: link 100/1000/2500, activity | Power: on-off
Alarms & Inputs	A 3-pin Waterproof M8 connector with: - one solid state relay output warning (with configurable action), 1 Form A, 60VDC 80mA max - one input for external device control 24VDC max
Power supply	Dual insulated redundant input (1500V insulation, M12 connectors 4-pole A-coded) 24 to 110 VDC (EN50155 nominal), with ground lug.
Consumption	27W typical power consumption (dual radio), 30W max
Dimensions & weight	Compact shockproof rugged aluminum enclosure, (L: 80 x l: 175 x h: 57 mm), 900g Removable fixing plate: 4-point fixing plate with ground lug (L: 80 x l: 225 x h: 4 mm), 200g
Environment	Operating: -40°C to +70°C (HR 0-99%) Storage: -40°C to +80°C IP66 seal rating, GORE ® protective vent (dehumidifying membrane)
Standards and certifications	**CE (RED)** Cybersecurity: EN 18031 Safety: EN 62368-1:2014+A11, EN62311 EMC: EN 301 489 [-1], [-17] Radio (WiFi) : EN 300 328 (2.4 GHz), EN 301 893 (5 GHz, DFS) Radio (5G) : EN 301 908 (-1, -2,-13), EN 301 511, EN 303 413 **RAILWAY** EMC: EN 50155, EN 50121-4, EN 50121-3-2 Fire/smoke: EN45545-2 (HL3), NF F16-101 (M1F1), NFPA 130 **BUS** EMC: ECE R10 (E2) Fire/smoke: UNR118 **ITxPT** Certified according to Linden version **Environmental** Shocks and vibration: EN 61373 (CAT 1 CLASS B) Climatic: EN60068-2 [-1, -2, -30]

Ordering references

RailBox/DVA0_V2	5G router with WiFi 6 and GNSS, for railway and mobile applications (such as buses), shipped with a fixing plate (already mounted).

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